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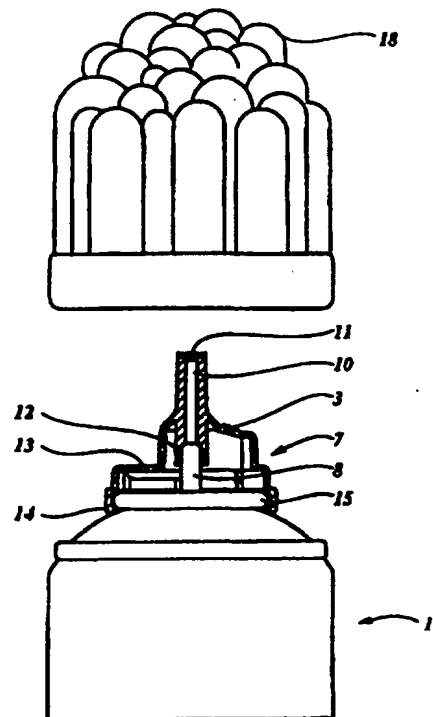
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(54) Title: DISPENSING DEVICE FOR THE PREPARATION OF A FOAMY BEVERAGE

## (57) Abstract

A device (1) is described for delivering a liquid food concentrate as a high-velocity jet in an aqueous liquid for the preparation of a foamy beverage, such as a milkshake or cappuccino. The device (1) is provided with a container which is pressurized or can be pressurized, such as for example an aerosol can, having a delivery assembly (7) with an operating component (3) and an outlet channel (10) having a delivery nozzle (11), the smallest internal diameter of the outlet channel (10) and the delivery nozzle (11) being at most 1 mm. By using this device to squirt a fruit syrup, for example, into milk, an excellent milkshake is obtained. A cappuccino with an excellent head of foamed milk is obtained by using this device to squirt thickened milk into coffee. A method for the preparation of a foamy beverage, such as a milkshake or cappuccino, is also described.



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## DISPENSING DEVICE FOR THE PREPARATION OF A FOAMY BEVERAGE

The invention relates to a device for delivering a liquid food concentrate as a high-velocity jet in an aqueous liquid for the preparation of a foamy beverage, comprising a container which is pressurized or can be pressurized  
5 and a delivery assembly with an operating component and an outlet channel having a delivery nozzle, which delivery assembly is designed to connect the outlet channel with the inside of the container.

A device of this kind is known from US-A-3,622,354.  
10 This American patent describes an aerosol can, the delivery assembly of which comprises an outlet channel having a diameter of more than 3 mm (0.125 inch). By squirting the food concentrate as a high-velocity jet out of the aerosol can into, for example, water or milk, a ready-made, mixed milk-  
15 shake-like beverage is obtained, it no longer being necessary to stir manually. Using this aerosol can, a food concentrate, such as a cocoa-containing milk concentrate, can be delivered. It is assumed in this document to be known to use a delivery nozzle having an internal diameter of 1.27-  
20 2.29 mm (0.05-0.09 inch). According to the teaching of the American patent, this small nozzle diameter is undesirable, since it is easy for it to become blocked, and it is necessary to squirt for longer in order to deliver the desired quantity of food concentrate. As a solution to these pro-  
25 blems, the viscosity of the food concentrate to be delivered is reduced, so that conventional aerosol cans having a conventional internal diameter of about 3.18 mm (0.125 inch) of the delivery nozzle can be used.

However, it has been found that, using the nozzle  
30 dimensions in accordance with the prior art, the food concentrate and the liquid do not mix sufficiently during preparation and, moreover, there is insufficient formation of foam.

Surprisingly, it has been found that an excellent mixing action and delivery of the food concentrate can be achieved if, in accordance with the invention, the smallest internal diameter of the outlet channel and the delivery nozzle is at most 1 mm.  $\approx 0.339$  mm

A foamy beverage is understood in the present description to refer both to a milkshake-like beverage and a beverage having a floating layer of foam. Naturally, combinations of these are likewise possible. Examples of foamy beverages of this kind are milkshakes, foamed iced beverages, cappuccino, soup with froth, drinking chocolate with froth, frothy fruit beverages, etc. The foamy beverages can thus comprise both hot and cold beverages, soups and the like.

Preferably, the smallest internal diameter of the outlet channel and the delivery nozzle is 0.3-0.9 mm, and most preferably is 0.5-0.7 mm.

Advantageously, the device according to the invention comprises a food concentrate for the preparation of a milkshake-like beverage and a propellant.

In contrast to what is taught in US-A-3,622,354, it has been found that the viscosity is not a particularly critical factor in delivering concentrates for the preparation of foamy beverages. According to the said American patent, smaller nozzles (1.27 - 2.29 mm) appear to be suitable exclusively for concentrates having a high viscosity and larger nozzles (3.18 mm) for concentrates having a lower viscosity. Preferably, however, the viscosity of the food concentrate to be delivered using the device according to the present invention is as low as possible.

Highly viscous concentrates adhere to the inside of the container of the device, and devices of this kind cannot easily be emptied. Furthermore, highly viscous concentrates present problems when filling the devices in the factory, for example.

The liquid into which the food concentrate is squirted is not particularly limited, and may for example be milk, water or a prepared beverage, such as coffee, soup, lemonade, drinking chocolate, fruit juice and the like.

Advantageously, the food concentrate of the device according to the invention comprises a coffee whitener, in particular a dairy concentrate. Very good foamy beverages can be prepared using this device. By means of an appropriate choice of the coffee whitener which is squirted out of the device into an aqueous liquid, a floating layer of foam can be formed on the aqueous liquid, the foam substantially not being mixed with the liquid.

In this patent application, coffee whitener is understood to mean any liquid dairy concentrate derived from milk which is suitable for being added to coffee; this definition thus includes, for example, evaporated milk, condensed milk, thickened milk, inspissated milk and coffee cream. Furthermore, this definition comprises other liquid whiteners, such as for example those of vegetable origin. Most advantageously, the coffee whitener comprises thickened milk.

In an advantageous embodiment, the delivery assembly of the device according to the present invention which contains a coffee whitener also comprises an outlet channel having an opening which is of such a size that in use, the coffee whitener can be delivered through the said opening as a low-velocity jet. Using a device of this kind, it is possible to deliver the coffee whitener accommodated therein as a low-velocity or high-velocity jet, as desired. If a low-velocity jet is used, substantially no foam will be formed, but rather the coffee whitener will merely be added to the aqueous liquid, for example coffee. One should then stir manually, for example, for the purpose of mixing. By means of this embodiment, the same device can be used both for adding coffee whitener to the aqueous liquid and for applying a head of foam thereto. Thus, using a device of this kind, coffee, for example, can be provided both with coffee whitener and with a head of foam. As stated above, the delivery assembly of the device according to the present invention may comprise a plurality of outlet channels of different diameters, which can be employed as chosen by the user of the device for delivering the coffee whitener. Thus, these outlet channels can connect the desired outlet

channel to the interior of the container using the operating component, for example by rotating or sliding the delivery assembly or components thereof, as a result of which the coffee whitener can be delivered through the selected  
5 outlet channel on actuation.

It is also possible to provide the delivery assembly with, for example, a tiltable operating component, one outlet channel being used by pressing on one side of the operating component and the other outlet channel on actuation  
10 of the other side of the operating component. It is therefore possible, by means of an aerosol can of this kind, by using a combination of both administering jets, thus one at low velocity and one at high velocity, firstly to provide the aqueous liquid, such as coffee, with whitener and then  
15 with a head of foam.

In a very advantageous embodiment of the present invention, the coffee whitener comprises thickened milk and the smallest diameter of the outlet channel lies between 0.5-0.7 mm. A device of this kind is extremely suitable for  
20 producing a head of foam on coffee, as a result of which cappuccino can be prepared.

In accordance with a very advantageous embodiment of the present invention, the delivery assembly of the device is provided with a closure cap, which cap comprises a container for one or more additional ingredients to be delivered.  
25 red. In addition to the food concentrate, other ingredients are often added to the foamy beverage to be prepared. The provision of a container for delivering these additional ingredients in the closure cap of the device according to  
30 the present invention renders a separate container, in the form of, for example, a dredger for additional ingredients of this kind, superfluous, and the additional ingredient in question is immediately available, which provides for considerable ease of use.

35 The additional ingredients may, for example, serve to change the taste of the foamy beverage, or to decorate it. Preferably, the additional ingredients are selected from the group consisting of sugar, cocoa powder, aniseed powder, chocolate vermicelli, cinnamon, grated chocolate,

herbs for soup. Thus, the device according to the invention can be used, for example, to squirt thickened milk into, for example, coffee or tea, and also to add, for example, sugar from its cap by sprinkling.

5 If coffee whitener is administered, forming a froth on, for example, hot milk, the milk, which has been provided in this way with a head of foam, can for example be enriched or decorated with aniseed powder or chocolate vermicelli using the cap of the device.

10 This embodiment is even more advantageous if the additional ingredient in the container in the cap comprises cocoa powder. A device of this kind can be used, with the aid of the device according to the invention, to make cappuccino from an ordinary cup of coffee and to decorate this  
15 cappuccino with cocoa powder, as a result of which it is possible to prepare a cappuccino which tastes just like, and has the same appearance as, a real cappuccino of Italian origin.

The device according to the invention may be designed  
20 as an aerosol can. However, the device may also be designed, for example, as a component of a larger device. In the case of milkshakes, consideration may be given here to a device for delivering cooled milk, the device according to the invention forming a component of this device. In the  
25 case of the preparation of cappuccino, consideration may be given to a coffee machine, such as an espresso machine, it being possible directly to provide freshly brewed coffee with a head of foam using the present device according to the invention. Here too, the device according to the inven-  
30 tion can form a component of the coffee machine.

The invention furthermore relates to a method for using a coffee whitener to produce a head of foam on an aqueous liquid, in particular coffee, which method is characterized in that the coffee whitener is squirted as a  
35 high-velocity jet into an aqueous liquid. When the coffee whitener comes into contact with the aqueous liquid, said whitener foams and rests as a foam on the aqueous liquid. The method can be carried out with the aid of a device described above, such as an aerosol can or, for example, as a

component of an espresso machine.

Preferably, thickened milk is used as coffee whitener in the method according to the present invention. By squirting thickened milk at increased pressure as a high-velocity jet into a suitable aqueous liquid, a foam of the thickened milk is formed on the aqueous liquid. Employing the method according to the present invention renders superfluous the production of a milk froth by, for example, whisking manually.

10 Furthermore, the present invention relates to a method for making cappuccino, which method is characterized in that thickened milk is squirted at increased pressure as a high-velocity jet into coffee. Hitherto, fresh cappuccino has been prepared either by heating milk and foaming it  
15 manually using a whisk or by blowing hot steam through the milk and then pouring the milk froth formed onto freshly brewed coffee. Using the method according to the present invention, a cappuccino is made which is comparable in terms of quality to that which is made using a method in  
20 accordance with the prior art. It should be noted that pulverulent, ready-to-use cappuccino mixes are also available commercially, which mixes should be mixed with hot water to obtain a cappuccino-like beverage. However, the quality of a beverage of this kind does not compare to cappuccino pre-  
25 pared in accordance with the prior art or the invention.

By selecting the coffee whitener appropriately, or by using a composition which comprises the coffee whitener, and by varying the aqueous liquid into which the coffee whitener is squirted, it is possible to produce numerous  
30 variations of beverages having a head of foam. Thus, a composition comprising thickened milk or coffee cream and alcohol or a distilled alcoholic beverage can be used to prepare, for example, Irish coffee or one of its variants. By selecting milk as the aqueous liquid, hot drinking chocolate with a head of foam can be provided by, for example,  
35 firstly adding cocoa powder to the milk and then squirting thickened milk or coffee cream into the milk. It is also possible, in a similar manner, to prepare, inter alia, aniseed milk with a head of foam.



The method is in no way limited to hot beverages, such as for example coffee, tea, milk or soup; it is also possible to provide a foam on a cold beverage, as is illustrated in Example 4 below. It is possible, for example, to make a variant of "Café frappé", which is extremely well known in tourist areas around the European Mediterranean, by squirting thickened milk into cold instant coffee.

Furthermore, the invention provides a method for making a foamy beverage, a food concentrate being squirted as a high-velocity jet into an aqueous liquid, which method is characterized in that the jet formed has a diameter of at most 1 mm just before being delivered. By squirting a food concentrate, for example a suitable fruit concentrate, in the form of a jet of this kind into, for example, milk, a milkshake of excellent quality is obtained; the food concentrate is thus homogeneously distributed in the milk and the milkshake has a generally airy character, without it being necessary to stir, whisk or foam the milkshake further. By adding a coffee whitener in the form of a pressurized jet of this kind to coffee, an attractive foam will generally be formed on the coffee.

Advantageously, the jet formed is 0.3-0.9 mm just before being delivered. It has been found that a food concentrate delivered using a pressurized jet formed in this way will result in an extremely attractive milkshake, and in the case of coffee whitener being delivered will lead to a very attractive foam.

Even more advantageously, the jet formed is 0.5-0.7 mm just before being delivered. A concentrate delivered under pressure in this manner forms an optimal and stable milkshake of outstanding quality. Coffee whitener delivered under pressure in this manner foams to form an optimally attractive and stable foam on coming into contact with the aqueous liquid.

Advantageously, the pressure for squirting the food concentrate is at least 6 bar. At lower pressure, a foamy beverage of lower quality is usually formed.

For a milkshake or other foamy beverage which has an optimum quality, in a very attractive embodiment of the

present invention the pressure on delivery of a food concentrate lies in the range from 9-10 bar. The pressure on delivery of a food concentrate may also be higher than the values given, for example 15 bar, without adversely affecting the formation of foam. At such a higher pressure, however, greater demands are placed on the pressurized container or the delivery assembly, which under certain circumstances may lead to a disproportionate increase in the costs in relation to any additional improvement in the foaming properties.

The invention will be explained in more detail below with reference to the appended drawing, in which:

- Fig. 1 shows a device according to the present invention in use;
- 15 Fig. 2 shows an embodiment of a device according to the present invention, in partial cross-section; and
- Fig. 3 shows a side view of a delivery assembly of a device according to the invention.
- Fig. 4 shows a delivery assembly with a closure cap according to the present invention in partial cross-section.
- 20

Fig. 1 shows a device according to the present invention in the form of aerosol can 1, which is being held by a hand with a finger 2 on an operating component 3. A jet of food concentrate delivered from aerosol can 1 is indicated by 4, which concentrate is directed towards a glass 6 in which an aqueous liquid 5 is situated. If finger 2 presses on the operating component 3 of the device 1, jet 4 of a food concentrate is squirted into a liquid 5, which may, for example, be milk. The foamy beverage is obtained due to the high velocity of the jet.

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Figs. 2 and 3 show the device 1 in accordance with Fig. 1, these figures showing a delivery assembly 7 in cross-section and side view, respectively. Devices usually comprise a discharge channel 8, which also serves as operating component for the shut-off valve of the device. The delivery assembly 7 comprises an operating component 3, by means of which the device 1 can be operated. Furthermore, an outlet channel 10 having a delivery nozzle 11 is pre-

35

sent, which delivery nozzle has, in accordance with the invention, an internal diameter of at most 1 mm. The outlet channel 10 is provided with a suitable tapering end 12 which is closely connected to the discharge channel 8 of the device 1. With 13, a plastic hinge is indicated. The delivery assembly 7 is clamped on a beaded edge 15 of the device 1 by means of an inwardly directed collar 14. With 18, a cap is indicated.

In Fig. 4, the delivery assembly 7 of device 1 is provided with a closure cap 19 which is provided with a container 20 with cover part 21. Additional ingredient 22 is situated in chamber 20. Cover part 21 may be provided with perforations, through which additional ingredient 22 can be delivered. Furthermore, the cover part may comprise an additional closure intended to cover the said perforations.

In the embodiment shown in the figures, the smallest internal diameter of the outlet channel to the delivery nozzle is present at the location of the delivery nozzle. Although this embodiment is preferred, it is not absolutely necessary. The smallest internal diameter could also be present in the outlet channel 10.

Preferably, the outlet channel 10 is as short as possible, in order to avoid any post-expansion of food concentrate delivered in the said channel.

Although a preferred embodiment of the device according to the invention is shown above, it will be clear that the invention is not limited thereto, and that numerous variants of the operating component 3, the outlet channel 10 and the delivery nozzle 11 will be obvious to the person skilled in the art after reading the above description. For example, the delivery assembly 7 may have any desired shape, it being possible to consider, for example, the shape of a strawberry or other fruit, depending on the taste of the food concentrate to be delivered. Means for additionally acting on the food concentrate to be delivered may also be present in the outlet channel 10, such as for example deflectors which are frequently present in squirters for whipping cream.

The present invention will be explained in more detail on the basis of the following examples.

#### Example 1

The following food concentrate composition (in % by weight) was filled into a conventional aerosol can container:

	water	80.0
	deionized strawberry concentrate	10.0
	fructose	5.0
10	artificial sweetener	0.5
	milk protein	1.5
	gelling agent	1.0
	stabilizer	1.0
	flavourings	0.5
15	colorant	0.5

Nitrous oxide ( $N_2O$ ) was used as propellant. The sweetener was Acesulfam-K (E950), the gelling agent was alginate, the stabilizer was E450, and the colorant was carminic acid. Other possible propellants are air, carbon dioxide or mixtures thereof, optionally including nitrous oxide.

By squirting the food concentrate in a glass which is approximately three-quarters full with milk, an excellent strawberry milkshake was obtained.

#### Example 2

25 A cup of hot, freshly brewed coffee was used as the starting liquid for making cappuccino. Using a device according to the present invention, the pressurized container of which contained nitrogen as propellant at a pressure of 10 bar and in which thickened milk was accommodated as coffee whitener, the thickened milk was squirted into the coffee. Almost immediately after coming into contact with the coffee, the thickened milk formed a layer of foam on the coffee, without the coffee itself being foamed or acquiring an airy character. The smallest diameter of the outlet 35 channel of the aerosol can, and also the diameter of the jet of the thickened milk formed just before delivery, were 0.6 mm.

Example 3

As Example 2, but coffee which had been cooled to room temperature was used as the starting liquid. A foam having the same properties and quality as in Example 2 was formed.

Example 4

As Example 2, but coffee which had been cooled to 4°C was used as the starting point. A foam having the same properties and quality as in Examples 2 and 3 was formed.

CLAIMS

1. Device (1) for delivering a liquid food concentra-  
te as a high-velocity jet (4) in an aqueous liquid (5) for  
the preparation of a foamy beverage, comprising a container  
5 which is pressurized or can be pressurized and a delivery  
assembly (7) with an operating component (3) and an outlet  
channel (10) having a delivery nozzle (11), which delivery  
assembly (7) is designed to connect the outlet channel (10)  
with the inside of the container, characterized in that the  
10 smallest diameter of the outlet channel (10) and the deli-  
very nozzle (11) is at most 1 mm. *Similar  
to SN 27 402*
2. Device according to claim 1, characterized in that  
the smallest internal diameter of the outlet channel (10)  
and the delivery nozzle (11) is 0.3-0.9 mm. *Same  
as 2*
- 15 3. Device according to claim 2, characterized in  
that the smallest internal diameter of the outlet channel  
(10) and the delivery nozzle (11) is 0.5-0.7 mm. *Same  
as 3*
4. Device according to one or more of the preceding  
claims, characterized in that the said device comprises a  
20 food concentrate for the preparation of a milkshake-like  
beverage and a propellant. *Same  
as 4*
5. Device according to claim 4, characterized in that  
the food concentrate for the preparation of the milkshake-  
like foamy beverage has a relatively low viscosity. *Same  
as 5*
- 25 6. Device according to one of the preceding claims,  
characterized in that the food concentrate comprises a cof-  
fee whitener. *milk?* *new*
7. Device according to claim 6, characterized in that  
the coffee whitener comprises a dairy concentrate. *new*
- 30 8. Device according to claim 7, characterized in that  
the coffee whitener comprises thickened milk. *new*
9. Device according to one of claims 6-8, character-  
ized in that the delivery assembly also comprises an outlet  
channel having an opening which is of such a size that in  
35 use, the coffee whitener can be delivered through the said  
opening as a low-velocity jet. *new*
10. Device according to one or more of claims 6-9,  
characterized in that the coffee whitener comprises thicke-  
ned milk and the smallest diameter of the outlet channel

lies between 0.5 and 0.7 mm.

11. Device according to one or more of the preceding claims, characterized in that the delivery assembly (7) of the device (1) is provided with a closure cap (19), which cap (19) comprises a container (20) for one or more additional ingredients (22) to be delivered.

NEW

12. Device according to claim 11, characterized in that the additional ingredients (22) are selected from the group comprising sugar, cocoa powder, aniseed powder, chocolate vermicelli, cinnamon, grated chocolate, herbs for soup.

13. Device according to claims 11 and 12, characterized in that the additional ingredient (22) comprises cocoa powder.

14. Method for using a coffee whitener to produce a head of foam on an aqueous liquid, in particular coffee, characterized in that the coffee whitener is squirted as a high-velocity jet into the aqueous liquid.

15. Method according to claim 14, characterized in that the coffee whitener comprises thickened milk.

16. Method for making cappuccino, characterized in that thickened milk is squirted as a high-velocity jet into coffee.

17. Method for making a foamy beverage, a food concentrate being squirted as a high-velocity jet into an aqueous liquid, characterized in that the jet formed has a diameter of at most 1 mm just before being delivered.

18. Method according to claim 17, characterized in that the jet formed is 0.3-0.9 mm just before being delivered.

19. Method according to claim 18, characterized in that the jet formed is 0.5-0.7 mm just before being delivered.

20. Method according to one or more of claims 14-19, characterized in that the pressure for delivery of a food concentrate is at least 6 bar.

21. Method according to claim 21, characterized in that the pressure for delivery of a food concentrate is at least 9 bar.

where is the pressure measured

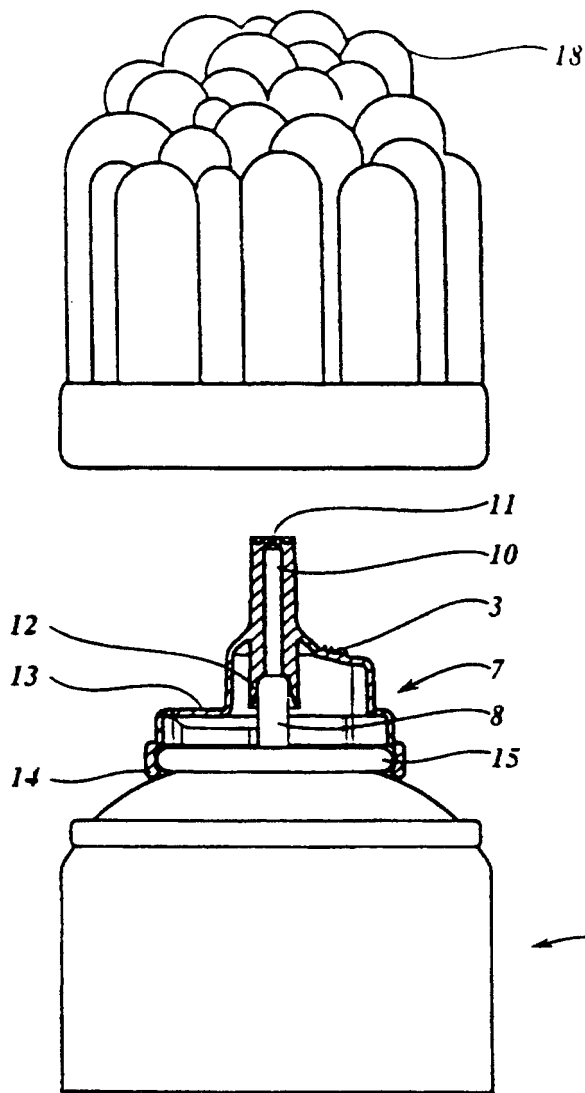


Fig. 2

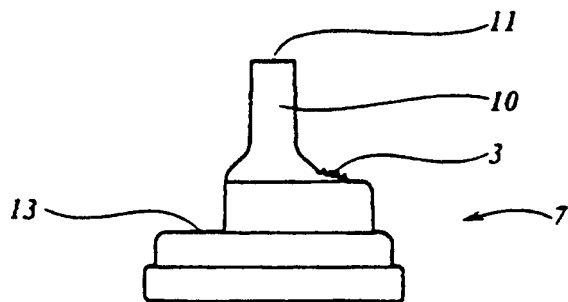


Fig. 3

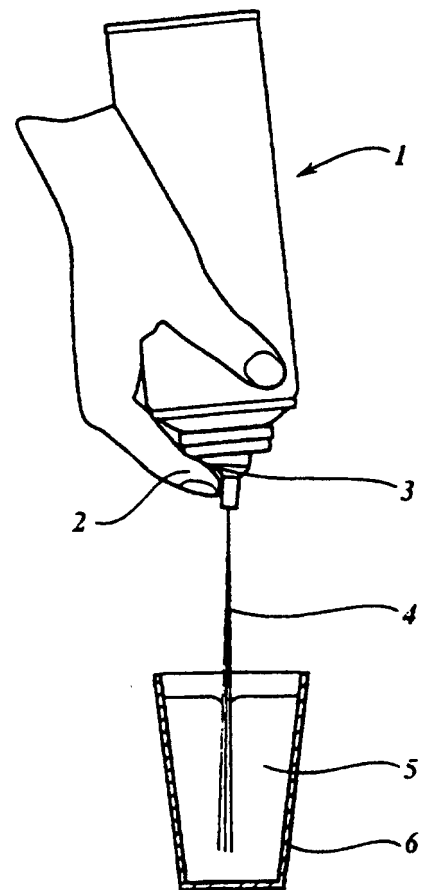
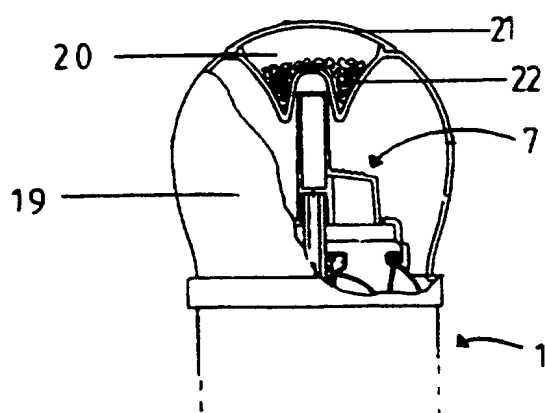


Fig. 1



**Fig. 4**

## INTERNATIONAL SEARCH REPORT

National Application No

PCT/NL 97/00109

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 B65D83/16 B65D51/28

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 977 231 A (I. FOX ET AL.) 28 March 1961	1-10, 14-21
Y	see column 5, line 1 - line 51; claim 7; figures 1-4	11-13
Y	--- WO 90 08710 A (STEVE'S HOMEMADE ICE-CREAM INC. ) 9 August 1990 see abstract; figures 1,2,4A	11-13
X	--- US 2 582 262 A (N.O. LOVEN) 15 January 1952	1-3
A	see column 4, line 72 - column 5, line 31; figures 1,2	14-21
A	--- FR 2 453 790 A (G. BILLOUD) 7 November 1980 see the whole document	1-21
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

14 July 1997

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International Application No

PCT/NL 97/00109

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